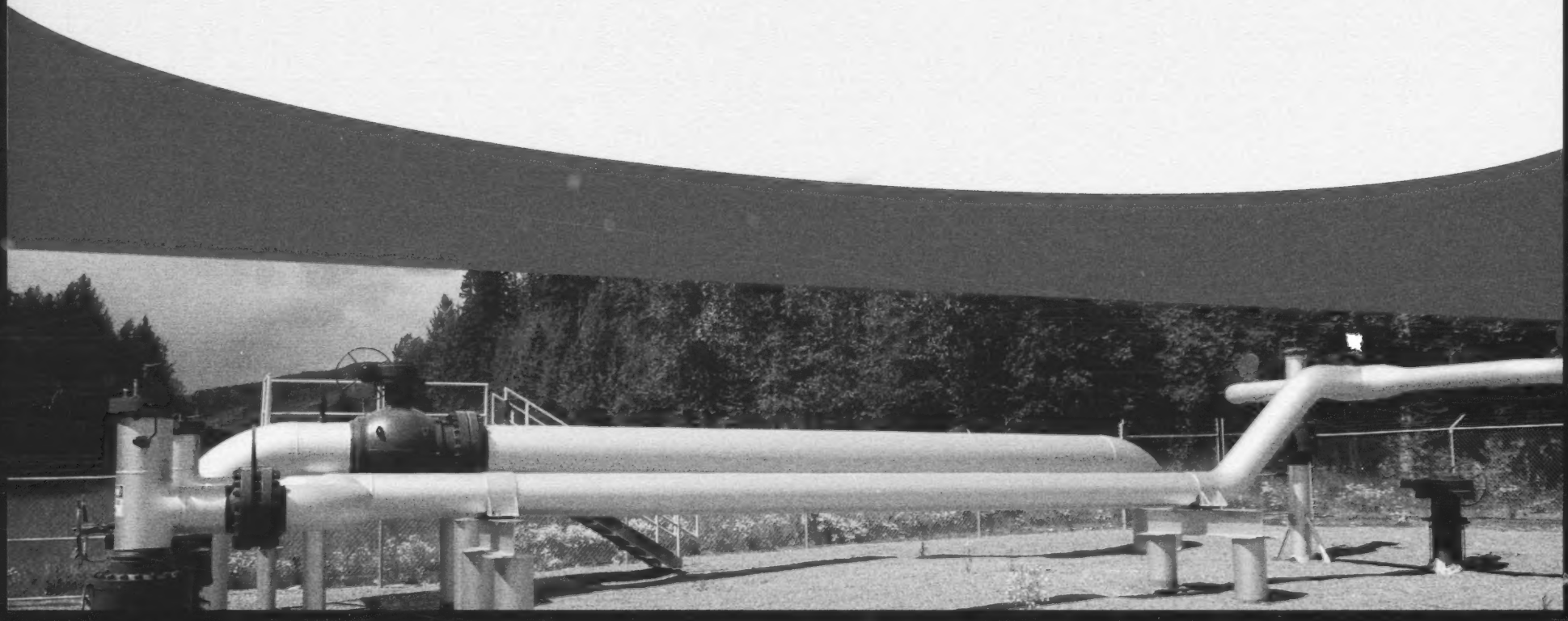
2014 Pipeline Performance Summary

BC Oil and Gas Commission



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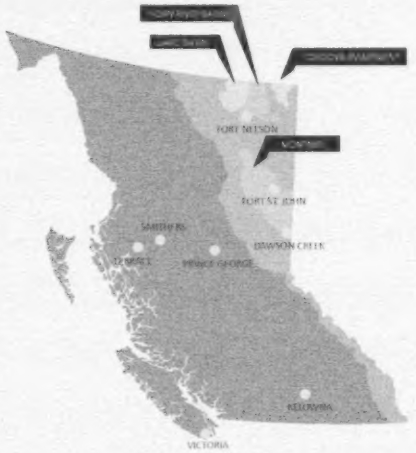
About the

BC Oil and Gas Commission

The BC Oil and Gas Commission is the provincial regulatory agency with responsibilities for regulating oil and gas activities in British Columbia, including exploration, development, pipeline transportation and reclamation.

The Commission's core services include reviewing and assessing applications for industry activity, consulting with First Nations, cooperating with partner agencies, and ensuring industry complies with provincial legislation and all regulatory requirements. The public interest is protected by ensuring public safety, respecting those affected by oil and gas activities, conserving the environment, and ensuring equitable participation in production.

For general information about the Commission, please visit www.bcogc.ca or phone 250-794-5200.



Mission

We regulate oil and gas activities for the benefit of British Columbians.

We achieve this by:

- Protecting public safety,
- Respecting those affected by oil and gas activities,
- Conserving the environment, and
- Supporting resource development.

Through the active engagement of our stakeholders and partners, we provide fair and timely decisions within our regulatory framework.

We support opportunities for employee growth, recognize individual and group contributions, demonstrate accountability at all levels, and instill pride and confidence in our organization.

We serve with a passion for excellence.

Vision

To be the leading oil and gas regulator in Canada.

Values

Respectful
Accountable
Effective
Efficient
Responsive
Transparent

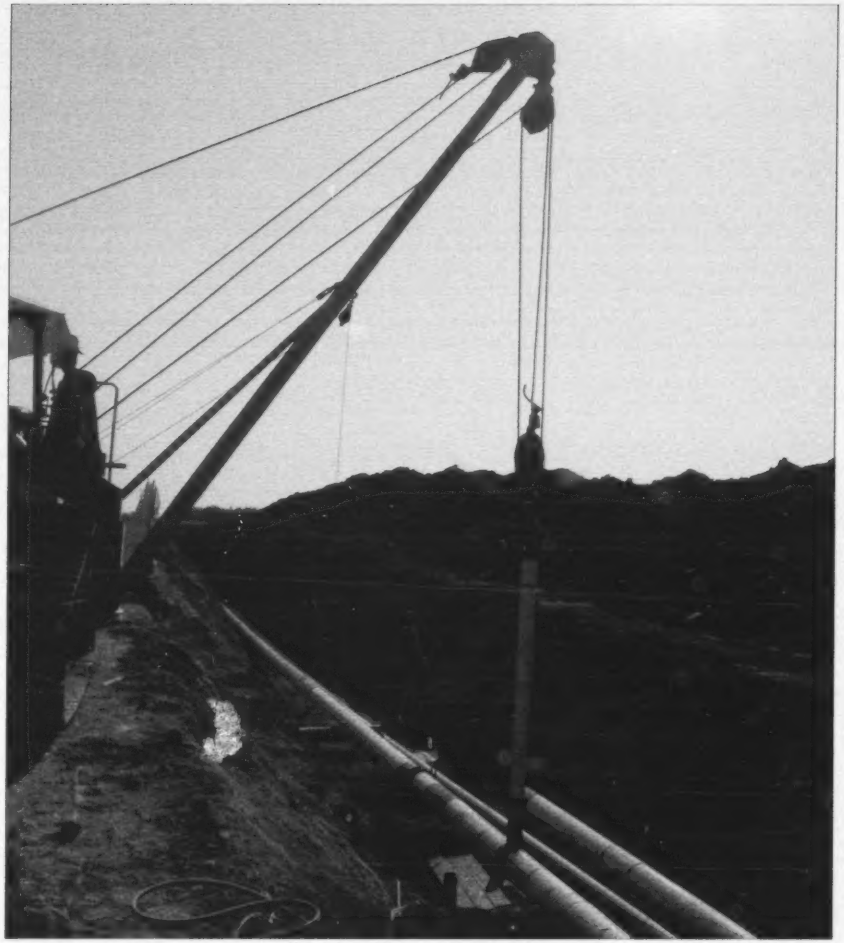
Purpose

Pipelines are recognized as a safe and economical mode of transportation, and secure operation is essential to protecting public safety and the environment. British Columbia's oil and gas industry depends on pipelines for the distribution of products such as natural gas, water and oil.

The BC Oil and Gas Commission (Commission) regulates more than 40,000 kilometres of pipelines in the province. Over 80 per cent of these pipelines transport natural gas, while only five per cent carry oil. The remainder carry water or other gases or liquids.

This report provides a statistical overview of pipelines regulated by the Commission in the 2014 calendar year. It includes data on types of pipelines, lengths, uses and overall incident rates. It also summarizes the Integrity Management Program, which ensures operators test and maintain pipelines to mitigate potential integrity issues.

Forty-two incidents occurred on pipelines regulated by the Commission in 2014. However, not all led to the release of a product. In the event of an incident, a pipeline is shut down immediately. The Commission ensures it is fixed before going back into operation, and that the site has been completely remediated if there was a release.



Pipeline Regulation

The Commission's jurisdiction extends to the majority of pipelines in British Columbia, as defined in legislation by the Oil and Gas Activities Act (OGAA). Activities regulated by the Commission extend throughout the lifecycle of a pipeline, and include permitting, construction, operation, maintenance and abandonment. Pipelines not under the Commission's jurisdiction, which include those crossing provincial and/or national borders and gas utility pipelines, are not addressed in this report.

Pipelines are regulated under the Pipeline Regulation, which states they must be operated and maintained in accordance with CSA Z662 – Oil and Gas Pipeline Systems. CSA Z662 is a national standard developed and maintained by the Canadian Standards Association and covers the design, construction, operation and maintenance of oil and gas industry pipeline systems. It is required under OGAA that operators meet this standard. Other applicable regulations include the Environmental Protection and Management Regulation and Consultation and Notification Regulation.

Pipelines Defined

Pipelines regulated by the Commission are defined by legislation in OGAA. "Pipeline" refers to, except in Section 9 of OGAA, piping through which any of the following are transported:

- Petroleum or natural gas.
- Water produced in relation to the production of petroleum or natural gas, or conveyed to or from a facility for disposal into a pool or storage reservoir.
- Solids.
- Substances prescribed under Section 133(2)(v) of the Petroleum and Natural Gas Act.
- Other prescribed substances.

The scope of the definition also includes installations and facilities associated with the piping, but does not include:

- Piping used to transmit natural gas at less than 700 kilopascals (kPa) to consumers by a gas utility as defined in the Gas Utility Act.
- A wellhead.
- Anything else that is prescribed.

Pipeline Inventory

The Commission regulates 42,681 kilometres (km) of pipelines in British Columbia. Pipelines transport a number of refined and unrefined products including natural gas, sour natural gas, crude oil, water, high vapour pressure (HVP) hydrocarbons and other miscellaneous gases and oil effluent.

As shown in Table 1 (next page), in 2014 a net addition of 2,289 km of total registered pipelines went into operation or were reactivated. The most significant increase was for sour natural gas pipelines with 788 km becoming active.

Classifications of Pipelines

Abandoned
Pipelines removed from service and not maintained for a later return to service.
Deactivated
Pipelines removed from service but maintained for a later return to service.
Operating
Pipelines actively used for the transport of fluids related to oil and gas operations, and piping that has been suspended from service for less than 18 months but not formally deactivated.

Classifications of Products

Sour Natural Gas – natural gas with a hydrogen sulphide (H_2S) partial pressure greater than 0.3 kilopascals.
Natural Gas – natural gas, sweet gas and fuel gas.
Crude Oil – crude oil, sour crude and low-vapour-pressure hydrocarbons.
Water – freshwater, produced water, saltwater and sour water.
High-Vapour Pressure – ethylene, propane, pentanes and liquid ethane.
Other – miscellaneous gases and liquids, condensate and oil emulsion/effluent.

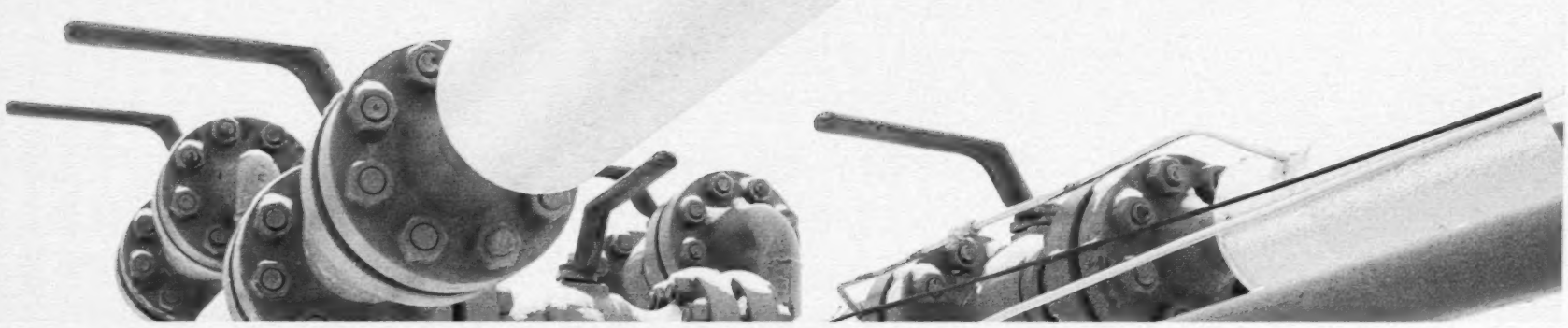


Table 1: Total lengths of pipelines by type and status (in kilometres)*

	2013				2014			
Type	**Total**	**Operating**	**Deactivated**	**Abandoned**	**Total**	**Operating**	**Deactivated**	**Abandoned**
Natural Gas	20,176	19,017	593	566	20,865	19,564	703	598
Sour Natural Gas	12,951	12,104	596	251	13,739	12,715	763	261
Water	2,397	2,159	158	80	3,205	3,000	61	144
Crude Oil	2,594	2,398	55	141	2,336	2,073	168	95
Other	265	209	10	46	2,178	1,927	71	180
HVP	2,009	1,818	130	61	358	302	10	46
Total	**40,392**	**37,705**	**1,542**	**1,145**	**42,681**	**39,581**	**1,776**	**1,324**

*Note: As part of the Commission's ongoing commitment to data integrity, some product types were reviewed and updated in 2014 to more accurately reflect actual pipeline fluids. As such, changes in 2013 pipe length by product are reflected here.

Integrity Management Programs

The Integrity Management Program (IMP) assures the integrity of pipelines throughout their entire lifecycle, including pipeline design, construction, operation and maintenance. Integrity management enables identification, management and control of the potential risks affecting the integrity of pipelines in a timely manner.

As per Section 7 of the Pipeline Regulation, every permit holder designing, constructing, operating, maintaining or abandoning pipeline infrastructure in B.C. must have an IMP. Permit holders are required to follow Annex N in CSA Z662. Annex N provides guidelines for developing, documenting and implementing an IMP to provide safe, environmentally responsible and reliable service.

The Commission's IMP assessment program was initiated in 2011 to ensure compliance from all pipeline permit holders. Where non-compliances are identified, corrective actions are implemented by the permit holders to correct the deficiencies. The Commission monitors and assesses all corrective actions until they are fully implemented.

In 2014, 30 permit holders were selected to participate in the IMP assessment program, with 22 completing the process (the remainder no longer had operating assets or ceased to exist as independent entities due to mergers or acquisitions). In total, 74 permit holders have been assessed since 2011, and 94 are expected to be completed by the end of 2015. The Commission will continue to assess the IMP programs of all pipeline permit holders in the next IMP assessment cycle (2016-2020).

IMP Process Steps

1. Selection of operators
2. Notification and invite to kick-off meeting
3. Kick-off meeting
4. Submission of Self-Assessment Protocol (SAP) and other manuals
5. Review of SAP and IMP manuals
6. Assessment meetings
7. Compilation and submission of Final Assessment Report (FAR)
8. Submission of corrective actions and follow-ups
9. Assessment closing letter

Pipeline Emergency Requirements

Section 37 of OGAA states an operator or person carrying out an oil and gas activity must prevent spillage and promptly report any damage or malfunction that could cause spillage to the Commission. Section 38 contains a provision whereby the permit holder must prepare and maintain an emergency response program and response contingency plan approved by the Commission.

If spillage occurs, the following actions must be taken:

- Remedy the cause or source of the spillage.
- Contain and eliminate the spillage.
- Remediate any land or water affected by the spillage.
- Report the location and severity of the spillage and any damage or malfunction to the Commission.

A person aware that spillage is occurring, or may occur, must take reasonable efforts to assist in containing or preventing the spillage. Assistance can be provided by calling the operating company indicated on signs identifying the location of the pipeline, or by calling the Commission's 24/7 emergency phone line. Depending on the level of the incident, the Commission may respond with trained personnel to ensure any risks are mitigated.

Permit holders must prepare and maintain emergency response programs and response contingency plans and update them annually. The Commission regularly audits these programs and may also oversee emergency exercises. Failure to satisfactorily meet these requirements can result in compliance and enforcement actions, which may include fines or shutting-in a pipeline system.

Pipeline Incidents

In 2014 there were 42 incidents on pipelines regulated by the Commission[1]. Table 2 shows an overall incident frequency of 0.98 for every 1,000 km of pipelines, a slight increase from 0.94 in 2013.

Not all pipeline incidents result in spills. In 2010 the implementation of OGAA led to broader reporting criteria, meaning all incidents – including those that have the potential to affect the integrity of a pipeline but did not cause spillage – must be reported.

All incidents are responded to by the Commission and assessed to determine what remedial actions must be taken and whether the pipeline can continue to operate. If required, the Commission will issue orders to the permit holder for remedial actions. A permit holder must submit a post-incident report summarizing the root cause of the incident, repair methods, operational changes and design changes that may be required.

The Commission then conducts an investigation to determine the causes and contributing factors, and any remedial actions and/or repairs are identified in order to prevent a recurrence. Based on the results of these investigations, the Commission may issue recommendations to industry as a whole.

Table 2: Total number of incidents per 1,000 km of pipeline inventory

	2011	2012	2013	2014
Length of Pipelines (km)	39,023	40,125	40,392	42,681
Number of Incidents	34	27	38	42
Incident Frequency (Incidents/1,000 km)	0.87	0.67	0.94	0.98

1 These incidents apply only to events on operating pipelines. Incidents that occur prior to a line going active (such as during construction or pressure testing) have not been included. There were 13 incidents related to construction and one related to a pressure test in 2014.

Releases and Spills

In terms of incidents that involved a release or spill, Table 3 shows natural gas pipelines had the lowest incident rate with a frequency of 0.43 per 1,000 kilometres (not including the zero incidents on HVP pipelines). Crude oil pipelines had the highest incident frequency at 3.0, and water had the second highest at 0.94.

In the event of a pipeline gas release or liquid spill, the Commission ensures it is completely cleaned up and remediated by the company, and that all problems are fixed before operations resume. An investigation takes place into every incident to help ensure it does not happen again.

The largest gas release from a pipeline in 2014 was a 200,000 m^3 release of sweet gas in the Laprise Creek area near Wonowon. The leak was caused by a combination of external corrosion and a geotechnical shift. Upon discovery of the leak, the operator shut-in the pipeline, and it was repaired before going back into service.

The largest liquid spill from a pipeline in 2014 was 100 m^3 of sour oil in the Elm Field. The operator enacted its emergency response plan and shut-in the pipeline. The cause of the failure was determined to be a defective pipe body. The spill was cleaned-up and the pipeline is being completely abandoned and replaced.

Table 3: Total number of incidents with release per 1,000 km by type of pipeline in 2014

Type of Pipeline	Length of Pipeline (km)	# of Incidents	Frequency (per 1,000 km)
Natural Gas	20,865	9	0.43
Sour Natural Gas	13,739	6	0.44
Water	3,205	3	0.94
Crude Oil	2,336	7	3.0
Other	2,178	2	0.92
HVP	358	0	0.00

Incident Causes

Table 4 shows metal loss was the leading cause of pipeline failures in 2014, contributing to 21 incidents. External interference was the second leading cause of failures contributing to nine incidents, most caused by third-party interference.

Table 4: Classification of Pipeline Failures

Incident Cause	Definition	2012	2013	2014
Metal loss	*Wall thickness reduction (due to corrosion, for example)*			
Total		**12**	**22**	**21**
Pipeline/equipment failure	*Failure of pipeline and/or equipment*			
Cracking in pipe	Mechanically driven or environmentally assisted cracking of the pipe	1	0	3
Pipe fittings/join failure	Failure in valve, weld, flange, etc	4	4	0
Miscellaneous equipment	Failure in the tank, compressor, site seeing glass, etc	1	0	0
Total		**6**	**4**	**3**
External Interference	*External activities causing damage to pipe*			
Third party interference	Interference by someone other than operating company or its employees/contractors	2	5	1
Company	Interference by operating company or its employees/ contractors	1	4	8
Vandalism	Interference caused willfully	0	0	0
Total		**3**	**9**	**9**
Material Manufacturing or Construction	*Defects in the fitting, construction or components*	**0**	**2**	**1**
Geotechnical Failure	*Loss of integrity due to geotechnical effect*	**4**	**1**	**8**
Other Causes	*Other causes not included in previous definitions*			
Improper Operation	Decision error made by operating company during service	2	0	0
Overpressure	Failure caused due to overpressure of pipe	0	0	0
Total		**2**	**0**	**0**
Total Incidents		**27**	**38**	**42**

Moving Forward

The Commission is undertaking IMP compliance assessments for all B.C. pipeline operators, while continuing to engage with companies to improve the design, construction, operation and maintenance of pipelines, including older, legacy pipes.

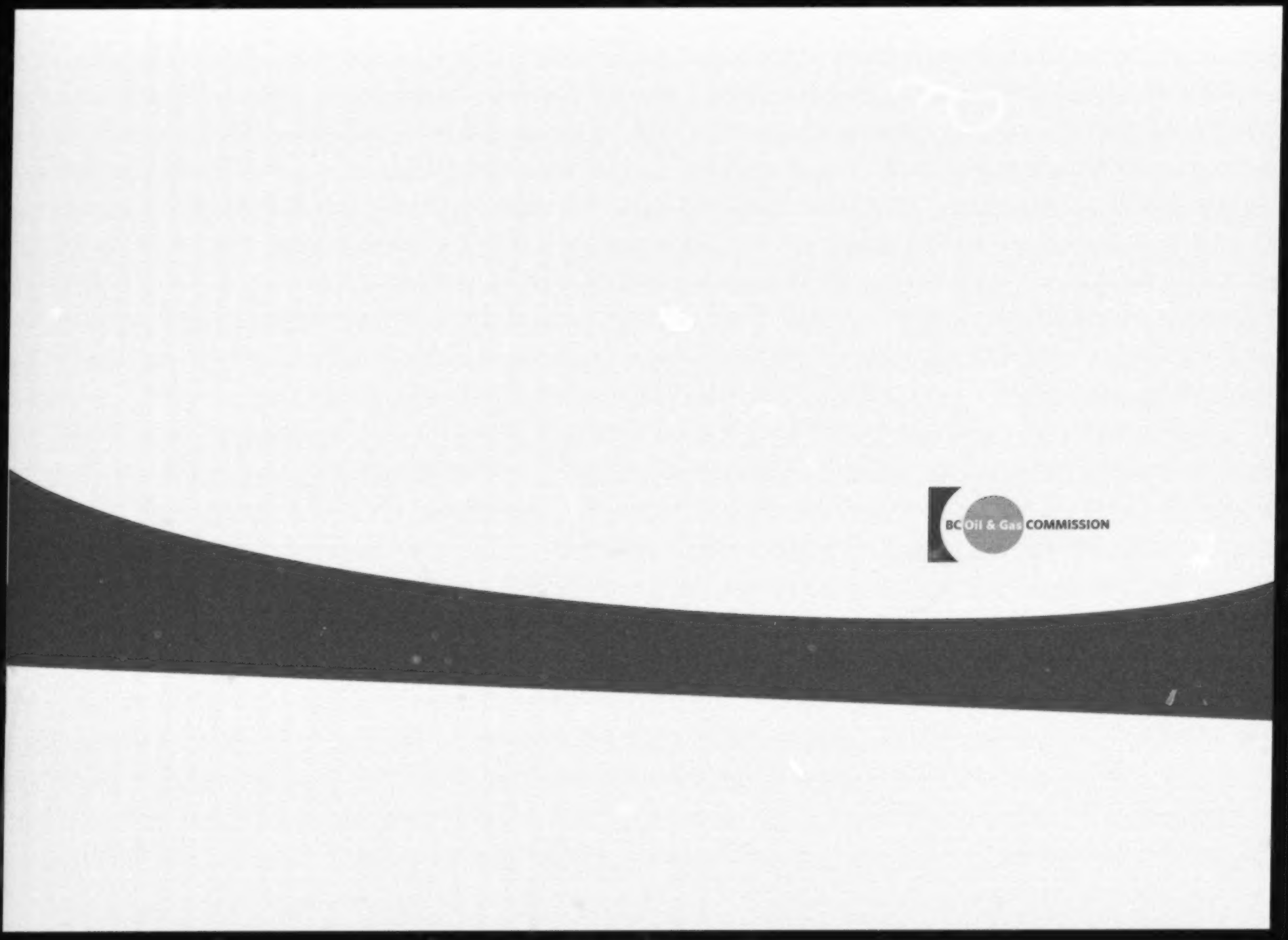
The Commission recognizes the need for communication and transparency in regard to its role as B.C.'s regulator of oil and gas activities and protecting public safety. Efforts will continue to enhance information and knowledge sharing between the Commission, public, stakeholders, engineers and experts.

More Information

Contact www.bcogc.ca

This summary was published in February 2016 and is updated annually. Previous pipeline performance summaries can be found here. For specific questions regarding this document please contact ogc.communications@bcogc.ca. For more information on pipelines see our:

- Pipeline Regulation
- Pipelines Fact Sheet
- Pipeline Permit Application Manual
- Pipeline Operations Manual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